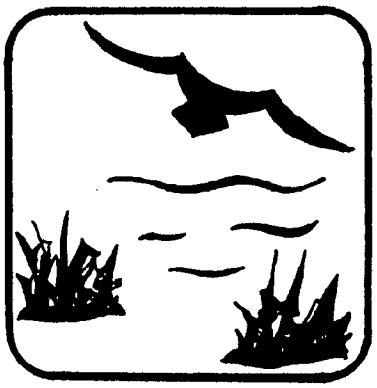
land capability study

Prepared For : THE LOUISIANA STATE PLANNING OFFICE
By : BURK AND ASSOCIATES, INC.



land capability study

of the Louisiana Coastal Zone

Prepared For:
THE LOUISIANA STATE PLANNING OFFICE
COASTAL RESOURCES PROGRAM
Baton Rouge, Louisiana

AUGUST, 1977

By:
BURK AND ASSOCIATES, INC.
New Orleans, Louisiana

The preparation of this report was financed in part through a grant from the U.S. Department of Commerce under the provisions of the Coastal Zone Management Act of 1972.

NOTICE:

This document is disseminated under the sponsorship of the Louisiana State Planning Office in the interest of information exchange. The State of Louisiana assumes no liability for its contents or the use thereof.

TABLE OF CONTENTS

GUIDELINES FOR LAND CAPABILITY STUDIES

Any land capability or suitability study, whether for industrial, residential or recreational use, etc., must be predicated on several criteria and assumptions. These criteria and assumptions should reflect the trends and attitudes underlying the project, and should be based on the social values, established by the Burk and Associates staff, State Planning Office personnel and the Louisiana citizenship. Following is a series of suitability study guidelines which can be applied to each of the suitability models. These guidelines are based on currently accepted planning principals and the known sensitivities of the Louisiana Coastal Zone.

1. Care should be taken to maintain the character of features or areas containing historic, scenic, recreational or cultural significance.

2. Care should be taken to protect critical wildlife habitat areas such as lakes, bayous, wetlands and undisturbed land from inappropriate or insensitive development.

3. Existing land use patterns should be maintained, and if possible, intensified so that needless sprawl can be avoided.

4. The aesthetics of a particular land use type must be considered. The potential for a land use type to mar pristine vistas or to have an unpleasing smell or noise level must be considered.

5. Valuable hunting and fishing grounds should be avoided by dense land use patterns.

6. Land use types that could potentially block tidal flow in estuarine areas should be avoided.

7. Inappropriate land uses should be prohibited from areas where they might block any active and viable access to existing residential, commercial and industrial areas.

8. Natural protective areas, and weak shoreline areas (potential inlets, etc.) along the Gulf coastline should be assessed so that development can avoid any potential flood hazards or washout areas.

9. Land uses should not be recommended for areas that would conflict with existing or planned port facilities or water traffic.

AN OVERVIEW OF DEVELOPMENT

The word "development" is applied to many different kinds and sizes of human projects. In effect, development means different things to different people. Generally, however, development can be defined as the process by which man alters the features of the land for a specific human use or uses. The residential, commercial, industrial, recreational and other categories used in land use inventories and plans are examples of types of development.

These types of development are undertaken to fulfill the great variety of human needs, but lately there has been considerable argument about how much development and what type of development should be allowed in an area. Some people favor development because it is necessary to accomodate an expanding population and increase the economic benefits to an area. Others are opposed to development because it often adversely affects the environment and converts open space into an intense human use. Both of these viewpoints are partially valid. Growth and development are inevitable as population grows and a prosperous economy is certainly more desireable than an ailing one. At the same time we are becoming more aware of the sometimes irreversible negative effects of development on the environment. Natural resources and open land are limited and there is a need to conserve them for the future.

Development in the Coastal Zone of Louisiana is occurring at a faster rate than in other parts of the state. One reason is that population in the

coastal parishes has been expanding rapidly while the up-state parishes have, for the most part, remained stable or actually declined in population. Between 1970 and 1985 it estimated that Louisiana's Coastal Zone population will grow by 32 percent. Approximately 22 percent of this increase is attributed to inmigration from the up-state parishes and areas outside of the state.

The major reason for this sizeable expansion in coastal area population is the vitality of the region's economy. Jobs are relatively plentiful, particularly in comparison with the rest of the state. Petroleum extraction and refining activities form the basis of this economic prosperity and are responsible for creating many other employment opportunities in related industries.

The development which has resulted from this coastal population expansion and economic activity is often concentrated in several areas within the Coastal Zone. The New Orleans -- Baton Rouge corridor is the largest such concentration and smaller areas of intense activity are found throughout the Coastal Zone. Rapid growth, however, is not restricted only to these few areas but is occuring throughout the coastal parishes. This has resulted in a tremendous increase in the demand for land to be developed.

This demand for developable land is a problem in the Coastal Zone because there is such a limited amount of easily developable land. Basically, developable land should be well drained, have stable soil conditions for building foundations and be relatively free from flooding. In some parishes, such as Orleans there is a projected shortage of developable land.

When easily developable land is not available wetlands and other

marginal areas (in terms of use for development) are drained and used to satisfy the demand for land. Because these areas are often not capable of adequately supporting development many problems can result. Soil subsidence causes foundations and slabs to crack. Within the past several years unstable soil conditions have also caused numerous ruptures in residential gas supply lines. Many of these areas experience flooding and other drainage problems due to the nature of the landscape.

The effects of development also have a severe impact on the fragile coastal environments. Because the coastal area is more environmentally fragile than upland areas the conversion of natural areas to developed areas has a greater affect on the ecosystem. The disposal of solid waste, sewage and other developmental by-products also poses a greater problem in the Coastal Zone.

An important coastal industry, fishing, is linked to the environment. Louisiana's commercial fish catch is larger than that of any other state and it is the third ranking state in terms of fisheries employment. If development is inappropriately located in the Coastal Zone this vital industry and the resources it depends upon could be irreparably damaged. Even those fish which are caught in the open sea are dependent on the coastal estuaries as nursing waters and seasonal habitat. This means that these areas deserve certain protection measures. Oil and gas reserves are declining, but with proper planning and management the fishing industry can utilize a renewable resource for an indefinite period of time.

The coastal areas also are of value to the citizens of Louisiana and the

nation in terms of recreation, wildlife habitat and scenery. While it is difficult to attach a monetary value to these factors, they are none-the-less important to society. Encroachment on these areas by development is becoming more common with each year and there is a need to formulate better policies on this issue at the state level. Certain areas need to be set aside for preservation, others should be used for recreation and other non-intense uses, while other areas can be developed to accomodate human needs. Developing the most appropriate areas can result in retention of important resources while meeting man's needs.

Public officials have a need for accurate information regarding the capability of the land to support various types of development, the probable environmental consequences of development and in general,which activities an area is most appropriate for. Without this type of information unfortunate development decisions will continue to be made. In the past, homeowners have had problems due to soil subsidence, but the problem really is one of poor location and inadequate preparation of the location. Channels have been dredged through fragile marsh areas, changing their ecology, and adversely affecting fish and shellfish habitats. One reason these and other developmental choices were made is that there has been no source of information which includes the many factors which both affect development and are affected by it.

COASTAL ZONE SUITABILITY MODELING FOR DEVELOPMENT:

PRELIMINARY INFORMATION

The Coastal Zone Suitability study provides the state with a package of information pretaining to development in the coastal parishes. The comprehensive and coordinated nature of the study supplies reliable data in a standardized format so that comparisons can be made throughout the Louisiana Coastal Zone. The study is intended as an aid to planners and public officials who must make the difficult decisions which are involved with development. As such, the models do not by themselves, provide the final answer, but they do provide information which improves the quality of the answer.

For the purposes of this study, "Development" is defined as any significant, regulated human use of the land. "Significant" use of the land infers that decisions, relating to development, will normally be limited to clusters or strips of development rather than individual units or scattered fragments. This limitation is due to the general nature of the study, and the constraints of working with such a large land area. For example, a single, isolated structure would not be considered as development but a subdivision or group of structures would be. Similarly a family garden of two acres would not be considered as agricultural development, but a large farm would. In short, this means that the finest level of decision making for this project normally is for area of 30 to 40 acres (3 or 4 grid cells on the computer maps).

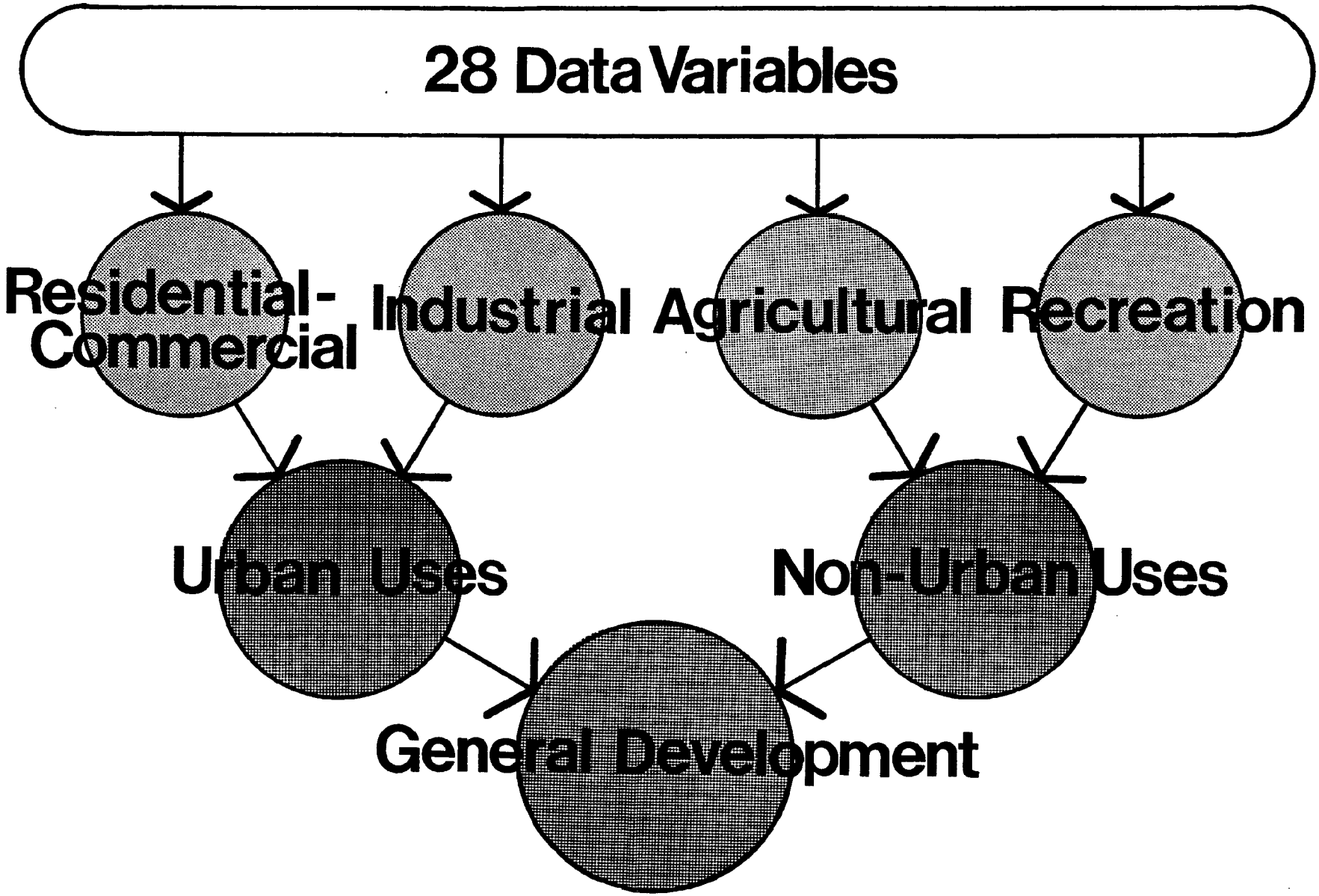
The end products of the O.C.S. IMGRID study are several suitability models with maps depicting the general appropriateness of areas for either a certain category of development or for development in general. An area appropriate or suitable for development is one that is relatively free of ecological, social and economic related development constraints. This is based on the constraints approach (as opposed to attractiveness) which is used in constructing the suitability models.

Twenty-eight data variables are used to determine suitability for development. Variables are aggregated into groups to create sub-models dealing with specific types of development. The flow chart on the following page illustrates how the data variables, sub-models and the general development model are linked together. Before these sub-models are reviewed several assumptions should be stated.

The results of a suitability model should not be interpreted as an absolute rule in either guiding or deterring development from a particular land area. The concept of suitable and non-suitable land is based on the identification of accumulated constraints that either would be, or should be involved with a development activity.

Because of the grid cell size (4 Ha.) and generalized nature of the information generated by the suitability models, the model results will not be a substitute for specific site studies and no precise sitings can be made based solely on the findings of a model. The results generally show whether or not an area of a parish or region is appropriate for development. Information generated by the suitability models will be useful in making broad-scale

Suitability Model Flow Chart



land use decisions and in formulating land use policies within the coastal zone. Also, it will be possible to obtain a generalized view of any environmental consequences for a proposed major development effort.

Finally, it should be mentioned that the generalized nature of the suitability models in the O.C.S. IMGRID study will in no way utilize the data library to its fullest extent. At any time, a precise site location or site evaluation study may be undertaken, using the same data library. For example this data may also be used to evaluate the appropriateness of a particular location as a site for a refinery or other specific activity or use. The two key differences involved in this type of project are that the study area will be much smaller and the criteria used in the suitability models will be much more specific.

SUITABILITY FOR AGRICULTURAL DEVELOPMENT

Existing agricultural land uses in the Louisiana Coastal Zone are very diverse. Crops such as rice, sugarcane, soybeans, cotton and corn, as well as pasture-land may be found in abundance in almost all of the coastal zone parishes.

Over the past ten to fifteen years, there has been a tendency for increases in cropland acreage, occuring mostly in wetland areas. For example, the Soil Conservation Service reports that over a million acres of wetlands were transformed into cropland between 1962 and 1971. Nonetheless, the total harvested acreage has decreased by about thirteen percent in the coastal zone over the period from 1929 to 1969.

The general decline in harvested acreage is attributable to several factors. Many advances in agriculture and agribusiness practice have allowed the farmer to produce more goods from less land. Also, government subsidies can be shown as detering factors to agricultural productivity. However, harvested cropland, whether increasing or decreasing in acreage, is one of the best agricultural indicators, not only for areas in production but for the favorable or unfavorable conditions surrounding those areas.

Floyd L. Corty, of the L.S.U. Dept. of Agricultural Economics and Agribusiness, divided the coastal zone parishes into three areas, based primarily on terrain characteristics. These areas may be described as follows:

Area One - Coastal Parishes: The coastal parishes follow and touch the Gulf of Mexico. They include the parishes of Cameron, Iberia, Jefferson,

Lafourche, Plaquemines, St. Bernard, St. Mary, Terrebonne, Vermillion and Orleans. Farming activities are found mainly in the northern parts of the parishes and along the cheniers at elevations of five to seven feet above sea level.

Area Two - Second Tier: The second tier consists of thirteen parishes, including Acadia, Ascension, Assumption, Calcasier, Iberville, Jefferson Davis, Lafayette, Pointe Coupee, St. Charles, St. James, St. John the Baptist, St. Martin and West Baton Rouge. The terrain of the second tier is much more variable in topography and composition than the terrain of area one, and is sometimes referred to as coastal prairie in the southwest and recent alluvium in the southeast. The coastal prairie soils consists of grayish-brown or silty-gray loam about sixteen inches thick over a gray silty clay subsoil. The subsoil, because of its clay hardpan composition, provides an ideal base for holding irrigation waters in the extensive southwest Louisiana rice fields. In contrast, the well-drained alluvial soils found in the river basins are of mixed composition and their varying characteristics allows for a variety of agricultural uses. The predominant silty clay loams accomodate extensive sugarcane plantations while the heavier sharkey clays support cotton and mixed farming on the more northern alluvial plain areas.

The second tier is by far the most important and most productive agricultural area of the coastal zone. About fifty percent of the land in these parishes is devoted to agriculture (some two million acres). Also, the second tier area accounts for one half of all the agricultural production in the entire Louisiana Coastal Zone.

Area Three - Florida Parishes: The three Florida parishes; Livingston, Tangipahoa and St. Tammany, have a combined nineteen percent of their area devoted to agriculture. Farming in these areas is limited because of the poorly drained, shallow, silty soils. The major cash crop of these parishes is strawberries, yet the general trend over the past fifty years has been for a decrease in cultivated acreage and a slight increase in grazing and poultry production.

Using the harvested cropland indicator, it becomes clear that the characteristics of the second tier are the most conducive to agriculture, followed by the coastal parishes, second, and the Florida parishes, third. The agriculture suitability model will focus on identifying those areas of the coastal zone which are best suited for agriculture, along with the worst suited areas and those falling somewhere in between. The model will not only focus on the characteristics of the soils, but will take into account data types such as existing land uses, transportation types and structural development, etc. The model will not simply select appropriate areas for agricultural expansion - considering the trends for decreasing production acreage. Rather, the agricultural suitability model will identify the most valuable areas, whether currently in production or not, based on those ideal conditions which are usually found in the second tier parishes. Hence, suitability for specific types of agricultural production such as rice, cotton or sugarcane will not be shown. Rather, the model will serve to show those land areas which meet the greatest number of conditions, favorable to all types of production, i.e. general agricultural potential.

Even through mariculture is similar to agriculture (the only major difference being the medium of production), suitability for mariculture activity will be considered only as secondary in the model. Prime conditions for mariculture will differ significantly from those for agriculture (because of the need for constant water supply) and would confuse the model results which are being focused primarily on land based activities. One close tie between mariculture and agriculture will be the optimum conditions of the coastal prairie, which can serve both rice farming and crawfish or catfish farming as complementary enterprises.

Results of the agricultural suitability model will show the best land areas as being those which are capable of supporting multiple types of agricultural activity at intense levels of use. For example, a particular land area might be nearly perfect for rice production, but that area will not appear as good as a land area that is suitable for rice and can also be used for many other products. Conversly, land areas that appear as unsuitable are not necessarily unusable. Rather, any cultivation operation in these areas would be extremely difficult and even if they were successful, only a non-intense agricultural use would be possible. In short, it is important to remember that this suitability model can not address the location criteria for a specific agriculture type.

A precise location study could be done for a particular type of agriculture, using the same data and suitability modeling process. The major differences in this type of model and the one for general agriculture will be the size of the study area (normally it will be much smaller) and the level of detail that can be expressed in the site location criteria. For example, to locate

prime areas for rice production in Cameron Parish, very specific criteria could be identified that addressed that parish and its particular situation. Further, it would be possible to separate the model into individual topics or sub-models such as overall physical constraints, potential storm related damage, aesthetic considerations, potential detritus alteration, and so on.

Following is a description of the data variables which will be used in the general agriculture suitability model. Each data variable has been described in terms of the reasons for including it in this particular model. The description is intended to be a preliminary summary and does not include specific value assignments such as recodings or weightings.

Minimum Elevation will be used to show those land areas that meet any least acceptable standards. For example, it is doubtful that little land below five feet in elevation will be agriculturally productive. Similarly, variations in elevation above approximately fifteen feet will be of little consequence so long as other conditions are met.

Soil Associations is included because of the need to identify those soils which are typically the most productive, least productive and those with varying degrees of productivity. The soil associations may be simply combined and recoded into an appropriate sequence, using the criteria that were established by the Soil Conservation Service for the Important Farmlands map of the Burk and Associates Louisiana Coastal Resource Program project.

Land Loss Potential Due To Water Erosion is included because certain types of agricultural processes (i.e. rice production) require irrigation ditches or channels. These channels could be the source of significant soil erosion if

located in the improper soils.

Major Geologic Features will be used to show the locations of barrier islands, cheniers and beach ridges. Although these features are used for agricultural purposes, they are not conducive to a wide range of activities. Also, natural beaches, which are not conducive to any form of agriculture will be shown.

Surface Water Features will be used to show the various deterrent effects that water bodies have on agricultural land use. For example, a cell that contains a major lake or commercially navigated water body will be prohibitive to agriculture whereas a cell containing an intermittent stream will present only minor constraints.

Ground Water Resources will be used to show the ground water's compatibility with agricultural activities. Similarly, Maximum Depth Of Fresh Ground Water will show the abundance of fresh ground water which is important for irrigation considerations.

Potential Flood Hazard and Potential Washways and Inlet Formations will be used to show the location of high water areas during storms, especially those associated with tidal surge and any inlets that the surge could wash through. Such areas will be detrimental to agriculture, although not to the extent as with more structural or urban development types.

Several data types from Endangered Species Habitats and Important Land-Based Habitats will be included in the study. Selected habitat types, such as bald eagle nesting areas, white-tailed deer concentrations and loggerhead turtle nesting areas, etc., which should be protected, will be used as constraints

to agricultural potential.

Vegetation Types and Important Botanical Features will be used to show areas or vegetation that either present a constraint to agriculture when coupled with other terrain features, or contain a significant social value which makes them desirable for protective measures.

Existing Land Use will be used to show those areas that are currently devoted to agricultural production. Urban land uses and measures of proximity to them will be used to indicate non-suitable lands, so that prime agricultural lands will not be those that might readily be consumed by urban growth. Other areas, such as forests and recreation areas will be used as moderate constraints to agriculture suitability.

Non-Urban Public and Semi-Public Lands will generally identify barriers to agriculture. Areas, such as wildlife refuges which are federally owned will be an absolute barrier for agriculture whereas smaller features such as churches or cemeteries will be more compatible but will still present some constraint.

Structural Units Density and Transportation Types will be used virtually in the same context. The components of each data variable will be used to show physical constraints in varying degrees. For example, one structural unit in a cell or the occurance of a trail will have little disruptive effect on agricultural activity. However, areas of dense structures or the location on a major highway will totally prohibit agriculture.

Major Resource Production Areas is included so that those surface activities that would normally interfere with agriculture can be shown as constraints. For example, various types of extraction sites will be in direct

conflict with agricultural production.

Historic and Archeological Sites and Landmarks along with Undisturbed Natural Areas will be used to express absolute barriers to agriculture or any other development type. These barriers or constraints will reflect the pure social values, attributed to certain facilities and land areas.

Governmental Boundaries will be used for map orientation and will show areas of jurisdiction.

It should be noted that the data variables not included in this model are done so for two major purposes: 1) the data contained in them is not relevant to the model or 2) the specific data types of a variable have been adequately considered elsewhere.

SUITABILITY FOR RECREATIONAL DEVELOPMENT

Many forms of recreation and recreational development may be found within the limits of the Louisiana Coastal Zone. In fact, recreational development is one development form that is normally well suited for coastal areas. However, not all types of recreational activity, or recreational development, can be successfully located on sensitive coastal terrain due to many physical constraints and the probability of detrimental impacts on surrounding areas.

Recreational development may be divided into two broad categories; intensive, and extensive. Intensive recreational development requires a substantial amount of man-made facilities to be effective. Normally, they are located near or in urban areas, are concentrated in size, and are designed to accomodate specific activity types. Extensive recreational development, on the other hand, requires a limited amount of site improvements in comparison to the total land area involved. These extensive areas are usually large, with loosely defined boundaries. Development of extensive recreational areas is usually dependent upon adequate management and maintenance of the existing conditions, rather than the addition of new features. Several examples of intensive and extensive recreation activities and developments are given below:

Intensive	Extensive
Boat Launches, Sport Fields Court Games, Golf courses, Fishing Piers, Swimming Pools, Camp grounds, Historical Site Visitation, etc.	Boating, Hunting, Fishing, Nature observation, Hiking, Swimming, Picnicking, Camping, Etc.

In short, intensive recreation types tend to be very site specific, requiring precise locations while extensive recreation types are focused on broad areas (both of land and water) that are conducive to random, unstructured activity happenings.

It can be seen that creating a suitability model for intensive recreation activities or features will closely parallel a model created for residential and commercial development. For example, some general considerations for locating an activity type such as a golf course would be:

1. Location on areas of high, stable land.
2. Location in close proximity to desirable water features.
3. Location in close proximity to existing development.
4. Location in close proximity to major roads.
5. Location away from severe flood hazards and potential washways.
6. Location away from important wildlife habitats.
7. Location that is compatible with existing land use.

Similarly, suitability criteria for other intensive recreation types present the same general considerations. Therefore, the general suitability for intensive recreational development will be best shown in the residential-commercial suitability model. The suitability model for recreation will focus only on the topic of extensive recreation activity and development.

It is possible to divide extensive recreation into more distinct categories such as water related and land related, even to the point of identifying specific types of activities and features. However, the nature of this project does not focus on making precise location for a particular type of extensive recreation. The extensive recreation suitability model, therefore, will be structured to identify broad-based areas capable of supporting either

water related or land related extensive recreation activities.

In future applications this general classification can be narrowed down to more precise locations for specific activities. This can be accomplished by considering the requirements of a particular activity: hiking, for example. Basically an area appropriate for hiking should have relatively dry, firm soil and should avoid major highways, urban areas or densely developed areas. Additionally, hiking trails and areas should be scenic and interesting. Information about these and other requirements for hiking is contained in the data variables. The data variables Maximum Elevation, Soil Associations and Vegetation Characteristics all relate to the appropriateness of the soil and terrain for hiking and these variables would be used in a hiking model. The variable weights and data element coding schemes of variables such as Structural Units Density would be adjusted so that any trail area would avoid those areas which are densely developed or in close proximity to large developments. This would assure that the area is generally free of conflicting uses or constraints on hiking. This example, using hiking, is presented to show the potential of the IMGRID modeling process for future applications. It is presented in the most simplified terms and is by no means complete.

Using a constraints approach for constructing an extensive recreational suitability model, those data variables and data types which either present a physical constraint, or would be detrimentally affected, will be selected and used. Thus, the model will not pinpoint good or recommended areas,

but rather, it will illustrate the sum total of constraints, such as urban areas or prime farmland, which would normally prohibit an area from extensive recreational use. Good areas, those that are reasonably constraint free, will be those capable of supporting one or more of the many extensive recreation types.

Results of the model will show various levels of the general capability of large land areas to support extensive recreation. These results will not be site specific, and should not be interpreted as such. For example; it will not be possible to recommend that a particular town initiate activities towards developing camping areas. Obviously, decisions of this nature are based on several factors, such as land availability or ongoing municipal projects, which this suitability model cannot address. The extensive recreation model can be used in making evaluations, on a parish, regional or statewide basis, about either the importance of existing extensive recreational activities in the coastal zone, or the planning for future extensive recreational activities in appropriate areas as coastal development expands.

As was previously mentioned, data variables and data types are chosen using two viewpoints; one - does or should the data type being considered represent a physical constraint to extensive recreation or, two - would extensive recreational activities affect the data type in any detrimental way. Following, is a list of data variables which will be used in the extensive recreational model. A statement of justification for including each variable is also given.

VAR.#	Variable Name
	Natural Systems Data Variables
1	Maximum Elevation
7	Major Geologic Features
9	Surface Water Features
14	Important Land-Based Habitats
15	Important Water-Based Habitats
16	Endangered Species Habitats
17	Important Botanical Features
18	Vegetation Characteristics
	Human Features Variables
19	Existing Land Use
20	Non-Urban Public and Semi-Public Land
21	Structural Units Density
22	Recreational Areas
23	Transportation Types < proximity in general to, for access; certain activities need to avoid them
24	Major Community Support Facilities
25	Major Resource Production Areas
26	Historical and Archeological Sites and Landmarks
27	Undisturbed Natural Areas
28	Unique Manmade Features
29	Governmental Boundaries

Variable Use: Explanations

Maximum Elevation is included as a data variable because lower elevations, in marshy terrain are not suitable for land-based extensive recreation activities. These areas are, however, compatible with certain water-based activities such as duck hunting. Its primary purpose therefore, is to help distinguish between those areas which are suitable for land or water-based activity.

Major Geologic Features represent areas which are both attractive and unattractive to recreation. Barrier islands, for instance, are fragile landforms appropriate only for very limited camping, beachcombing and fishing activities.

In the low marsh areas salt domes and cheniers offer an opportunity for land based activities in an otherwise water oriented setting. The geologic features will therefore serve a dual purpose, first as measures of appropriateness for recreation and also as determinants of the general type of recreation.

Surface Water Features are an effective barrier to land-based recreation. Certain elements such as intermittent streams are inappropriate to both water and land-based recreation. This variable also delineates those water bodies which can host many forms of recreation and those which can accomodate only limited recreational use. A large lake is suitable for almost all types of water-born recreation but a wetland area is more environmentally fragile and can only accomodate a limited number of activities.

Important Land-Based Habitats, Important Water-Based Habitats and Important Botanical Features, serve to differentiate between appropriate land and water recreation areas. Certain elements such as loggerhead turtle nesting areas should be avoided by all recreational activities. These variables will serve a dual purpose, first as a determinant as to the general type of recreation and also as an indicator of the appropriateness of an area for recreational use.

Endangered Species Habitats are areas which pose a problem to recreational use of the land or water. These areas are appropriate for fewer activities and require more regulation in terms of management and supervision than areas which do not contain endangered species. Certain endangered species, such as the American Alligator, are less vulnerable than others such as the Brown Pelican. The coding scheme will reflect this vulnerability by

by suggesting that an area with a highly vulnerable animal habitat be limited in scope for recreational use.

Vegetation Characteristics define upland and wetland areas by the location of types of plants. This variable is used to establish whether an area is generally appropriate for land-based or water-based activities.

Existing Land Use, Non-Urban Public and Semi-Public Lands, and Structural Units Density are three human features variables which are somewhat similar in content and use in terms of recreational suitability. Each variable contains some elements which are compatible with extensive recreation and some which are incompatible with it. For example, areas with many structural units are not suited for recreational activity while areas with no units are suitable. Similarly existing residential, commercial or industrial land should be avoided by recreational activities, but land classified as forest, wetlands or recreational is appropriate for recreational pursuits. The coding scheme of the data elements contained in the variables reflects the appropriateness of an area for recreation.

Recreational Areas, of course, are included because they are areas specifically designated for such activities. The data elements coding scheme will indicate the number of pursuits which an area can support.

Transportation Types is included because they provide access to the recreation areas, but the routes themselves should be avoided. Proximity to roadways is important in terms of access, but proximity to an airport zone is also important in the sense that such an area should be avoided whenever possible.

Major Community Support Facilities and Unique Manmade Features are similar variables. Most of the data elements contained within the variables should be avoided by extensive recreation. Power substations, hospitals, refineries and other elements are not suited for recreational use nor are the areas in close proximity to them suited for such use. Certain elements, however, are appropriate for limited use by recreation. Levee ridges, for example, offer an excellent hiking opportunity. Similarly, oil and gas pipelines, and power transmission line right-of-ways are possible locations for off-road motorcycle trails.

Major Resource Production Areas also contain elements which are not suited for dual use as resource areas and recreation areas. For example, gravel and shell extraction sites should be avoided by recreational use. Conversely, forest areas are appropriate as both recreation and resource production areas.

Historical and Archeological Sites and Landmarks are generally not suitable for extensive recreational activity. Historic places are appropriate for site-seeing and tourist related activities but archeological sites are too easily disturbed or destroyed by man and should be avoided.

Undisturbed Natural Areas are appropriate for very limited recreation such as boating, fishing, hiking or site seeing. Other activities or heavy uses of such an area may alter the fragile ecology.

Governmental Boundaries are included for the purpose of orientation so that jurisdictional borders can be imposed on an area.

SUITABILITY FOR RESIDENTIAL AND COMMERCIAL DEVELOPMENT

Residential uses occupy more land than any other development category and to many people the word "development" often connotes a subdivision or cluster of apartments. Basically, the need and demand for more housing units is governed by population changes and prevailing economic conditions. If population is expanding then so will the need for additional housing units. The economy of an area has much to do with whether or not the needed new units will be built and what type of units they will be. If the economy of an area with an expanding population is healthy, then the people will be able to invest in new residential units. In short it can be said that residences will be in demand in those areas where employment is abundant and steady.

Before development can occur a potential residential area should also meet several physiographic location criteria. These requirements include good (stable) foundation conditions, good drainage characteristics and low probability of flooding. Under normal circumstances most regions contain enough areas which meet these criteria to satisfy their needs.

Other requirements for development include access by a major roadway and proximity to community support facilities such as sewer and water trunk lines, police and fire stations, and hospitals. The latter requirements are not as severe a developmental barrier as the former group of physiographic variables because these community support facilities can be provided prior to development. Areas in close proximity to these facilities are usually more attractive to residences because the community services are essentially already provided, which results in lower development costs.

Residential development of any area is usually accompanied by commercial development. Commercial establishments provide goods and services to the neighboring residential areas. Often commercial uses will be integrated with residential uses or they will occupy separate but geographically close districts. In either case the two uses are interdependent and their large-scale locational requirements are the same.

Prior to residential or commercial development of an area the probable affect of that development upon the area must also be considered. Sometimes this assessment of likely consequences is mandated by the Federal government in the form of an Environmental Impact Statement, but these effects should always be considered prior to building. How will sewage and garbage be treated? Where will it be dumped after treatment? Where will rainwater runoff be channeled and how will it affect nearby water bodies? These questions all relate to some of the unavoidable by-products of development.

As was discussed in the introductory chapter the economy of the Louisiana Coastal Zone is quite healthy. Largely because of this Coastal Zone population is expanding rapidly both by natural increase and by inmigration. By contrast many upstate areas are declining in both population and economic vitality. These factors have increased the pressure for development in general and residential development in particular. No longer are coastal parish residences rural in character; rather they are now predominantly large urban-type developments. Lake Forest in New Orleans East, for example, is a residential - commercial development that will accomodate 150,000 people. Houma, Morgan City and other coastal cities are also

experiencing residential growth, at a smaller scale.

Unlike the upstate cities of Louisiana, the coastal communities have a limited amount of suitable land upon which to build. This is attributable to the unstable soil conditions, generally high probability of flooding and poor drainage characteristics of the area. When these unfavorable conditions are combined with the high demand for residential land a problem arises. Often land which is only marginally suitable for residential or commercial use is pressed into service for those uses. The end result often is the loss of a productive wetland area and future development maintenance problems for the home owner and the parish or city government. Some of these problems include soil subsidence which results in slabs and streets cracking, and frequent flooding due to poor drainage characteristics and low elevation of the areas. Marginally suitable areas also pose a problem to the public services and utilities such as sewer, water and gas lines.

In the coastal setting the affects of development upon the land or environment are also more difficult to deal with. Treatment of sewage and solid waste is more important because the environment is more fragile. Ecologically appropriate locations for sanitary landfills and water bodies capable of handling runoff waters are more difficult to find in coastal areas than in inland areas. These problems cannot be taken lightly because they are the unavoidable by-products of all residential and commercial developments and should be considered prior to development.

The purpose of the residential and commercial development suitability model is to locate the most appropriate areas for that type of development

based on the natural physiographic characteristics and human features of the land. By considering the nature of residential and commercial development those areas designated as appropriate for development are also those areas which would result in the fewest environmental problems if developed. The model results are represented by areas which reflect different levels of appropriateness for development. Thus, if there is no really clear-cut appropriate area for residential development in a region, the area which is most capable of supporting development and presents the least potential environmental damage can be identified.

This residential and commercial suitability model is intended to be used at a regional level and will provide information useful in formulating policies and programs regarding large-scale developments and additions in the Coastal Zone. It can aid officials in making difficult decisions pertaining to the natural environment and development. The probable impacts associated with residential or commercial activity in a general area can be ascertained so that appropriate development action can be undertaken.

The model is limited to making general decisions about large areas because the information used is general and the scale of the model and resulting maps is large. This is an advantage in that large areas are covered but it is too broad to be used as a site or location study. The IMGRID process can later be easily adapted to a finer level of decision making by focusing on a smaller area and providing more specific information about the project being considered and the characteristics of the location.

The large scale of the project is also the principle reason that residential

and commercial uses are considered together in one model. The present scale or level of information is not fine enough to separate the two uses. At this scale the location requirements of the two uses are also generally the same. As with making more specific location decisions, the two uses can be separated in a more detailed, smaller scale suitability model.

Project scale is a limiting factor within urban areas where a diversity of uses coexist. It also cannot account for the renewal process within these densely developed urban areas.

Because the present level of the model is not site specific a location within an area designated as appropriate because the model cannot be interpreted as a site study. Also, the commercial and residential suitability model should not be interpreted as a location model which predicts the pattern of growth. The following is a list of variables which are considered in the commercial-residential suitability modeling process. These data variables are used from a constraints viewpoint, where an appropriate or suitable residential-commercial location will be one that lacks constraints to development.

Var. #	Variable Name
	- Natural Systems Variables -
1	Maximum Elevation
2	Minimum Elevation
3	Potential Departures
5	Soil Subsidence Potential
6	Land Loss Potential Due to Water Erosion
7	Major Geologic Features
8	Areas of Significant Shoreline Reconfiguration
9	Surface Water Features

Var. #	- Natural Systems Variables - (Cont'd)
12	Potential Flood Hazard
13	Potential Washways and Inlet Formations
14	Important Land Based Habitats
16	Endangered Species Habitat
17	Important Botanical Features
18	Vegetation Types

Human Features Variables

19	Existing Land Use
20	Non-Urban Public and Semi-Public Lands
21	Structural Units Density
22	Recreational Areas
23	Transportation Types
24	Major Community Support Facilities
26	Historical and Archeological Sites and Landmarks
27	Undisturbed Natural Areas
28	Unique Manmade Features
29	Governmental Boundaries

Variable Use: Explanations

The following brief explanations are included to show why a particular variable was chosen and how it is used in the suitability modeling process. It is intended to be a preliminary summary and does not include specific code value assignments. An example of a value assignment for the elements of the Maximum Elevation variable would be; O=15 or more feet above sea level, 1= 12 to 15 feet ... 9 = sea level or below. These value assignments will be discussed at a later time. The same is true of the weight that will be attached to a particular variable. These weights vary, depending on which sub-model (agriculture, commercial-residential, etc.) The variable is being used in, because that variable's role will change within each submodel. Note that these brief descriptions only explain one particular variable's role in relation

to the residential-commercial submodel. Since no weights are discussed the overall magnitude of the variable in the submodel and its relation with the other variables have not been finally established.

Maximum Elevation is included because higher elevations are generally more capable of safely supporting development. Minimum Elevation will be handled in a similar manner, with the lowest elevations being least suitable for development. Areas with large blocks of high ground are generally more appropriate for development. Potencial Departures compliments the two preceding variables by indicating if there is a change in elevation.

Soil Subsidence Potential is included because the sinking of ground in developed areas has been recognized as a problem in all coastal parishes and it should be considered prior to development. Land Loss Potential Due To Water Erosion is a similar variable which refers to the stability of land adjacent to water channels. Areas which have low soil subsidence potential and little potential for land loss coded as being appropriate for development.

Major Geologic Features are included because development, should if possible, avoid these areas. Commercial and residential development would not, for example, be compatible with oil deposits or barrier islands. Data elements are coded according to how much of a constraint they pose to development.

Areas of Significant Shoreline Reconfiguration are included because they represent ongoing changes in the land. Areas which are stable and not undergoing change are coded as being appropriate for development.

Surface Water Features are included because water features of an area

constitute a developmental constraint and a cost, both in terms of preparation of the land and the environment in general. Areas with no water bodies in them are coded favorably while areas having water bodies are coded as being inappropriate for development.

Potential Flood Hazard is a factor which must be considered in any type of development. Depending on the flood hazard, the development will need to be modified and the type and intensity of development monitored by public officials. Areas with nor or little flood hazard will present few problems to residential-commercial development and are therefore assigned favorable code values, while areas which have more flood potential have less desireable code values. Potential Washways and Inlet formations also present severe problems to residential - commercial development and should be avoided if at all possible.

Endangered Species Habitats, Important Land-Based Habitats, and Important Botanical Features are variables which contain factors concerning the natural environment. These plants and animals are both ecologically important and significant to society. The component plants and animals are coded according to their relative importance and the constraint they pose to development.

Vegetation Types represent areas that are conducive to or not generally suitable for development. Marsh areas, for example, are not ordinarily considered as appropriate sites for homes and business and such areas have a restrictive code assignment; while areas with Pleistocene Deposits are appropriate for development and their coding reflects this.

Existing Land Use is included to show present residential-commercial locations. Areas adjacent to existing development generally are under the greatest developmental pressure, and if other factors favor development, often are among the best places for new development. Proximity to existing residential-commercial development is therefore, considered. The existing residential-commercial areas themselves may be able to absorb new development if they are only partially developed. Industrial areas and wetlands are examples of areas that are not prefered for this type of development.

Non-Urban Public and Semi Public Lands generally pose a barrier to development. Large-scale lands such as wildlife refuges and landfills, as well as smaller scale activities such as churches and cemeteries deter development to some extent. Those uses, such as wildlife refuges, which are an absolute deterent to development are assigned restrictive code values, while lesser developmental barriers are assigned less severe code values.

Structural Units Density will be used in a similar manner as Existing Land Use. When the other variables are used in conjunction with this variable a better idea of suitability for development can be ascertained. Generally, areas which currently have a substantial number of dwelling units and other buildings will be unsuitable for large-scale development and are assigned restrictive code values. Areas with no buildings or few buildings receive more favorable code value assignment because substantial development would be easier to accomodate. It should be remembered that, by previous definition, "development" refers to a fairly large scale use of the land and not to the addition of scattered units.

Recreational Areas, Historical and Archeological Sites and Landmarks and Unique Manmade Features are all variables which either discourage development or are an absolute barrier to it. Recreational areas and historic sites, for instance, should be avoided if at all possible so that future generations can enjoy them. Unique manmade features, such as levees, refineries and pipelines must be avoided by residential - commercial development because of their functions. The components of these three variables are coded according to the severity of the barrier they present to development.

Transportation Types both encourage and inhibit residential - commercial development depending on the particular type of transportation. A railroad easement, for example, would in most cases discourage development of this type, but land adjacent to a highway would be more appropriate. Areas which are next to transportation types which discourage residential-commercial development are coded with restrictive values, while areas that are appropriate for development are coded favorably.

Major Community Support Facilities is a variable whose components are almost always attractive to residential - commercial development. Presence of such features as water lines, hospitals, and power lines make development much easier. Areas containing these features or close to them are coded favorably low, while areas far away from these services and facilities are coded restrictively, indicating that they are not as suitable for development.

Undisturbed Natural Areas are areas which are essentially unaltered by

man and exhibit some unique characteristics of the natural environment. If at all possible, these areas should be avoided by residential - commercial development and preserved for future generations to enjoy.

Significant Boundaries refer to governmental borders which indicate areas of jurisdiction and are included for the purpose of orientation.

SUITABILITY FOR INDUSTRIAL DEVELOPMENT

The term "industry" covers a wide range of activities from warehousing to large scale manufacturing plants and refineries. Warehousing and small manufacturing plants are termed "light" industry because they have few offensive characteristics such as noise or smoke, which are associated with "heavy" industry. Heavy industries include oil refineries, chemical plants, aluminum production facilities, shipyards and other large scale operations which are traditionally thought of as industrial activities. Because of the nature of their processes light industries often locate adjacent to residential or commercial uses while heavy industries tend to be more segregated into special districts or outlying areas.

Larger industrial plants, particularly heavy industrial activities, have several locational requirements. One of these requirements is good transportation access. The exact requirements vary by the type and scale of the particular industry but generally any potential industrial areas should be accessible by some combination of rail, major highway and commercially navigable water transportation. Another general inducement to location is the presence of certain basic community facilities and services such as power lines, sewer and water lines and others. The size of the any available land area is another constraining factor because modern plants with large-scale operations require a substantial amount of land.

Other factors also influence industrial location, but unlike the foregoing features they are not physiographic. Tax structure, labor availability and productivity, and proximity to raw materials and markets are examples of non-

physical industrial locational variables.

In the past ten years industrial investment in the up-state parishes has fallen or remained static, while it has steadily risen in the coastal zone parishes. In fact, between 1946 and 1971 over 78 percent of all new investment in manufacturing was in the Coastal Zone. This investment in coastal area industries has resulted in new jobs and it is estimated that 65 percent of all Louisiana manufacturing jobs are in the state's Coastal Zone.

Industry in the Coastal Zone is dominated by petroleum extraction and refining activities and their related processes. It is estimated that 10 percent of all new investments in U.S. petroleum and chemical refining activity in the past 10 years has been in Louisiana, and most of this was in the state's coastal area. The Coastal Zone parishes are attractive to petro-chemical industries because of their proximity to the raw materials and excellent water transportation network which allows the bulky products to be moved economically. Other factors also influence petro-chemical location but they generally are of secondary importance.

Besides petroleum related industries, the coastal area is also the focal point of Louisiana's ship and boat building industry, food processing activities and primary metals industry. Ship building and primary metal fabrication are heavily related to the oil industry and its offshore extraction activities. Some of this activity is also related to the national and international shipping industry. Food processing is centered in the coastal area because of the rich fishing grounds located in the state's wetlands and on the outer continental shelf. An estimated 25 percent of the nations annual domestic commercial

fish catch comes from Louisiana.

These coastal industries are important because they are a source of revenue to the state and its parishes and municipalities. They also provide many employment opportunities to the citizens of the area. Most of these industries are resource oriented and have located in the Coastal Zone for this reason.

Suitability modeling is an important tool for helping to locate general areas which are appropriate for industrial development. The modeling process considers the capability of an area to support industry based on the physiographic features of that area and the effects which are associated with industrial development. This methodology seeks to balance the concerns for environmental quality and possible industrial expansion.

The industrial suitability model will show those areas which generally would be appropriate and inappropriate for industrial development. Would an industry be appropriate for an area? What are the probable environmental consequences? These are the types of questions that the model will help to answer.

The results of the model are not intended to be an industrial site location study. Because a region or area is generally suitable for industry does not mean that a specific site in the area is, and the opposite may be true of a site found to be not suitable for industry. Because large areas are found to be suitable for industry does not mean that industry will necessarily move to the area. The decision by an industry to locate in a particular area

is based on many considerations, such as those previously discussed. Of these only the physiographic ones can be considered herein.

Since urban centers present a highly diversified land use pattern within a small area the model will not be able to easily pick out areas appropriate for industry in that setting. In more sparsely settled areas, however, the model should prove to be very useful. Another limitation of this model is the large scale of the map and general nature of the information concerning industry and the area. This limits the uses of this model to broad-scale decisions. This can be viewed as an advantage in that it encompasses the most common traits of both industry and the environment so that a good overall idea of suitability for development can be obtained.

Because heavy industry's location requirements are easier to separate from other forms of intense development, the suitability model will necessarily define areas that are most appropriate for heavy industry. This is not to say that these areas are unsuitable for light industry but such activities will usually locate on land which is less expensive.

In the future IMGRID can be used for more detailed studies by considering the specific type of industry, its requirements and effects on the environment. Usually a smaller area would also be used so that the geographic information could be entered in more detail. Consider the following brief example. If an industry requires access by all three forms of major types of transportation -- roadway, railroad and commercially navigable waterways -- this constraint can be included in the specific model. New variables can be

added to consider requirements not covered by those in the general industrial suitability variable list. The weighting of any variable can be altered to emphasize or de-emphasize its role as is required by the industry. The various components of each variable can also be recoded to emphasize their significance to a particular industry. For example, if the hypothetical industry described herein would also prefer to be located near existing gravel extraction sites, proximity to this data element of the major Resource Production Areas variable can be recoded for a higher significance.

The following is a list of variables to be used in determining the general capability of an area to accept industry.

Var. #	Variable Name
	Natural Systems Variables
1	Maximum Elevation
2	Minimum Elevation
3	Potential Departures
5	Soil Subsidence Potential
6	Land Loss Potential Due to Water Erosion
7	Major Geologic Features
8	Areas of Rapid Shoreline Reconfiguration
9	Surface Water Features
11	Potential Flood Hazard
12	Potential Washways and Inlet Formations
13	Endangered Species Habitats
15	Important Land Based Habitats
16	Important Botanical Features
17	Vegetation Types

Var. #	Variable Name Human Features Variables
18	Existing Land Use
19	Non-Urban Public and Semi-Public Lands
20	Structural Units Density
21	Recreational Areas
22	Transportation Types
23	Major Community Support Facilities
25	Historical and Archeological Sites and Landmarks
26	Undisturbed Natural Areas
27	Unique Manmade Features
28	Governmental Boundaries

Variable Use: Explanations

The following brief explanations are included to show why a particular variable was chosen and how it will be used in the suitability modeling process. It is intended to be a preliminary summary and does not include specific value assignments. An example of a value assignment for the Maximum Elevation variable would be; 3=15 or more feet above sea level, 1= 5 to 9 feet ... 0= sea level or below. These value assignments will be designated at a later time. The same is true of the weight that will be attached to a particular variable. These weights will vary, depending on which submodel (agriculture, commercial-residential, etc.) the variable is being used in, because that variable's role will change within each submodel. Note that these brief descriptions only explain one particular variable's role in relation to the industrial submodel. Since no weights are discussed the overall magnitude of the variable in the submodel and its relation with the other variables have not been finally established.

Maximum Elevation shows the highest elevation of the land in a grid cell,

while Minimum Elevation refers to the lowest elevation of the ground in a grid cell area. Large blocks of high ground are needed for industrial development as they are more desireable than low level areas. Potential Departures is derived from the preceding variables and is included to show changes in elevation at five-foot intervals. Changes in elevation can indicate possible problems to industrial development, particularly when used with the Potential Flood Hazard data variable.

Soil Subsidence Potential is included because the sinking of ground in developed areas has been recognized as a problem in all coastal parishes and industry must consider it prior to development. Land Loss Potential Due to Water Erosion is a similar variable which refers to the stability of the land adjacent to water channels.

Major Geologic Features are included because they are not suitable for industrial development and should be avoided if possible. Industrial development is not, for example, compatible with oil deposits or barrier islands.

Areas of Significant Shoreline Reconfiguration are included because they represent ongoing changes in the land. Areas which are stable are assigned favorable coding values while areas which are under-going a change have restrictive code values.

Surface Water Features are included because water features of an area constitute a developmental constraint and cost, both in terms of preparation of the land and the environment in general. Areas with no water bodies in them are coded favorably, while areas containing water bodies are coded as unsuitable. For the purposes of industrial development proximity to navigable

waterways is a desireable feature and will be coded favorably.

Potential Flood Hazard is a factor which must be considered in any type of development. Depending on the flood hazard the development will need to be modified and the type and intensity of development monitored by public officials. Areas with little or no flood hazard present few problems to industrial development and are assigned favorable code values, while areas which have more flood potential have higher code values. Potential Washways and Inlet formations present severe problems to industrial development and should be avoided if at all possible. Areas containing no potential for these features are coded favorably because they pose no threat to development. Areas with a washway potential are coded as being unsuitable.

Endangered Species Habitats, Important Land Based Habitats, Important Botanical Features are variables which contain factors concerning the natural environment. These plants and animals and their habitats are both ecologically important and significant to society. The component plants and animals are coded according to their relative importance. Areas with no endangered species, important land based habitats or important botanical features are coded favorably while areas containing some of these plant and animal features will be coded to reflect the degree of constraint that is presented by the elements.

Vegetation Characteristics represent areas that are conducive to or not generally suitable for development. Marsh areas, for example, are not ordinarily considered as appropriate sites for industries and as such have a

a restrictive code assignment; while areas with upland vegetation are coded favorably.

Existing Land Use is included to show present industrial locations and areas that, because of their present use, are suitable or unsuitable for industry. Areas adjacent to existing development generally are under the greatest developmental pressure, and if other factors favor development, often are among the best places for new development. Proximity to existing industrial development will, therefore, be considered. The existing industrial areas themselves may be able to absorb new development if they are only partially developed. Residential areas and wetlands are examples of areas that are not appropriate for this type of development.

Non-Urban Public and Semi-Public Lands generally pose a barrier to development. Large-scale areas such as wildlife refuges and landfills, as well as smaller scale activities such as churches and cemeteries deter development to some extent.

Structural Units Density is used in a similar manner as Existing Land Use. When the other variables are used in conjunction with these two variables a better idea of suitability for development can be ascertained. Generally, areas which currently have a substantial number of dwelling units and other buildings are unsuitable for industrial development. Areas with no buildings or few buildings would be more suitable for industry and would be appropriately coded. It should be remembered that, by previous definition, "development" refers to a fairly large scale use of the land and not to the addition of scattered units.

Recreational Areas, Historical and Archeological Sites and Landmarks, and Unique Manmade Features are all variables which either discourage development or are a barrier to it. Recreational areas and historic sites, for instance, should be avoided if at all possible so that future generations can enjoy them. Unique manmade features, such as levees, refineries and pipelines must be avoided by industrial development because of their functions. The components of these three variables will be coded according to the severity of the barrier they present to industrial development.

Generally, Transportation Types encourage industrial development. A railroad easement, or a major highway, for example, would in many instances encourage development of this type. Areas which are in close proximity to transportation types will encourage industrial development and will be coded accordingly while areas distant from such features will be coded as being less appropriate.

Major Community Support Facilities is a variable whose components are almost always attractive to industrial development. Presence of such features as water lines, and power lines make development much easier. Areas containing these features or in close proximity to them are coded favorably. However, some community facilities, such as hospitals, should be avoided by industries and areas containing these features are coded as being unsuitable.

Undisturbed Natural Areas are areas which are essentially unaltered by man and exhibit some unique characteristics of the natural environment. If at all possible, these areas should be avoided by industrial development

and preserved for future generations to enjoy. Areas which meet the criteria of unique natural areas are coded as being inappropriate for development, while areas which do not possess these characteristics are coded as being suitable.

Significant Boundaries refer to governmental borders which indicate areas of jurisdiction and are included for the purpose of orientation.

COMPOSITE DEVELOPMENT MODEL - GENERAL DEVELOPMENT CAPABILITY

The purpose of the composite model is to show which areas are appropriate for intensive human use of the land, as differentiated from those which are appropriate for some limited human activities.

The suitability model for general development capability will be created by collapsing the four preceding models into one, single model. Because general development consists of industrial, residential and commercial, recreational, and agricultural land uses; the suitability models for those land uses will be combined, using no additional input from the data library. Although it is possible to assign weightings to the models as they are combined, this practice should be avoided because all of the base data has already been modified by weightings. Any attempt to weight the models themselves will be entirely too subjective.

Constructing the composite model will be a two step process. First, the agricultural development potential model will be combined with the model for recreational development potential. This singular combination will show the general suitability for non-urban land use types and will be displayed as a computer map. Finally, the non-urban and urban components will be combined to show the finished composit, general development capabilities.

The final composite model will be one which considers the suitability of the land for development in general. This overview will show those areas which are most capable of supporting human activities, areas which are marginally capable of supporting development and those areas which generally should be precluded from development.

DATA VARIABLES

1. Maximum Elevation
2. Minimum Elevation
3. Potential Departures
4. Soil Associations
5. Soil Subsidence Potential
6. Land Loss Potential Due to Water Erosion
7. Important Geologic Features
8. Areas Of Rapid Shoreline Reconfiguration
9. Surface Water Features
10. Ground Water Resources
11. Potential Flood Hazard
12. Potential Washways & Inlet Formations
13. Endangered Species Habitats
14. Important Water-Based Habitats
15. Important Land-Based Habitats
16. Important Botanical Features
17. Vegetation Types
18. Existing Land Use
19. Non-Urban Public and Semi-Public Lands
20. Structural Units Density
21. Recreational Areas
22. Transportation Types
23. Major Community Support Facilities
24. Major Resource Production Areas
25. Historical and Archeological Sites and Landmarks
26. Undisturbed Natural Areas
27. Unique Manmade Features
28. Governmental Boundaries

Following, are synopses for each of the twenty eight data variables. In addition to a brief synopsis, each data variable has also been described using the topics as shown below.

Data Source: Identifies the original source(s) of information.

Data Limits: Identifies any aerial restrictions of the data; i.e., several data variables were limited to land areas within the coastal zone boundary.

Data Level: Identifies the three degrees of subjectivity which have been used in data gathering and coding.

Data Level One, refers to those variables which are well established, and are taken directly from reliable, printed sources.

Data Level Two, refers to those variables which have interpreted directly from level one data, using only objective methods.

Data Level Three, refers to those variables which have been derived from reasonable, subjective professional judgements based on level one data.

Legend: Identifies the data types that are included in the data variable.

Policy: Identifies the method used in coding and recording the data into a computer-compatable format.

Justification: Identifies the principal reasons for including the data variable in the data library.

1. Data Variable: Maximum Elevation

This data variable will show the maximum possible elevation of each grid cell and will be coded in five foot increments. These increments will begin with 0 to 4 feet, in the zero position, where the recorded contour line will be 5 feet.

Data Source: U.S.G.S. standard topographic quadrangle maps in both 15 minute and 7 1/2 minute series.

Data Limits: This data will be coded throughout the data bases.

Data Level: One

Legend:
0 = 0 feet to 4 feet including those areas below sea level
1 = 5 feet to 9 feet
2 = 10 feet to 14 feet
3 = 15 feet to 19 feet
Continued as necessary

Policy: The highest area in each cell will be located and elevation will be recorded to the nearest higher contour line.

Justification: This data variable is necessary to determine areas of land which are high enough to support development types in terms of engineering constraints and can also be applied to views analysis, upland habitat situations and related site location studies.

2. Data Variable: Minimum Elevation

This data variable will show the minimum possible elevation of each grid cell and will be coded in five foot increments. These increments will begin with 0 to 4 feet, in the zero position, where the recorded contour line is 5 feet.

Data Source; U.S.G.S. standard topographic quadrangle maps in both 15 minuted and 7 1/2 minute series.

Data Limits: This data will be coded throughout the data bases.

Data Level: One

Legend:
0 = 0 feet to 4 feet including those areas below sea level
1 = 5 feet to 9 feet
2 = 10 feet to 14 feet
3 = 15 feet to 19 feet
Continued as necessary

Policy: The lowest area in each cell will be located and elevation will be recorded to the nearest lower contour line.

Justification: This data variable will be applied to studies in terms on engineering constraints for development. It can also be used in the determination and description of lowland habitat areas, and will be used along with Maximum Elevation for the calculation of the data variable, Potential Departures.

3. Data Variable: Potential Departures

This data variable will show the maximum possible gradiant (the arithmatic difference in maximum elevation and minimum elevation.) for each grid cell. Because of the small grid cell size, Potential Departures will also be a direct reflection of slope.

Data Source: This data variable will be generated by Burk & Associates through the use of an additional routine, which will be added to IMGRID.

Data Limits: This data will be coded throughout the data bases.

Data Level: Two

Legend:
0 = No significant departures
1 = 5 feet potential departures
2 = 10 feet potential departures
3 = 15 feet potential departures
4 = 20 feet potential departures
Continued as necessary

Policy: Potential Departures will be created by subtracting the average value in each data entity for Minimum Elevation from the average value in each data entity for Maximum Elevation, on a cell by cell basis.

Justification: This data variable will be needed in order to assess the location and significance of landform rise and fall, including such features as chenier and beach ridges.

4. Data Variable: Soil Associations

This data variable will show the areal extent of all soil associations throughout the data bases.

Data Source: Soil Conservation Service parish maps for Louisiana showing basic soil associations.

Data Limits: This data will be coded throughout the data bases.

Data Level: One

Legend: See following pages

Policy: The soil association with the highest code value cell will have its value attributed to that cell.

Justification: This data variable will be used in studies where different limiting aspects of the soils become significant. Such studies, for example, could pertain to wildlife management as well as structural development considerations.

DATA VARIABLE # 4 CONT'D

DATA CODINGS FOR SOIL ASSOCIATIONS

LEGEND CODE #		SOIL ASSOCIATION NAME	PARISH
0	=	No soil in cell (water bodies)	
1	=	Acadia - Wrightsville Association	Acadia
2	=	Acy-Essen-Jeanerette Association	Ascension
3	=	Allemands-Carlin Association	St. James
4	=	Alligator-Baldwin-Iberia Association	Iberia
5	=	Alligator-Harris-Freshwater Marsh Assn.	Iberia
6	=	Alluvial Land Association	Iberia St. Martin Plaquemines
7	=	Baldwin-Cypremont Association	Iberia
8	=	Baldwin, Iberia, Cypremont, Jeanerette	St.Mary
9	=	Barbary Association	Ascension
10	=	Barbary-Sharkey Association	St. James
11	=	Beaumont-Morey-Midland Association	Vermillion
12	=	Bibb-Mantachie Association	Calcasieu Jefferson Davis St. Tammany Tangipahoa
13	=	Bowie-Ruston Association	St. Tammany
14	=	Brackish Marsh-Harris Association	Iberia
15	=	Buxin-Portland-Perry Soils: Mixed Clay Alluvium	St. Mary
16	=	Caddo-Beauregard Association	Calcasieu Jefferson Davis
17	=	Cahaba-Kalmia Association	St. Tammany
18	=	Cahaba-Strough Association	Tangipahoa
19	=	Calhoun-Oliver Association	Livingston Tangipahoa
20	=	Calhoun-Zachary-Frost Association	East Baton Rouge
21	=	Cascilia-Ochlockonee Association	East Baton Rouge
22	=	Clayey Alluvial Land	Iberville
23	=	Commerce Association	Ascension St. Martin
24	=	Commerce Convent	St. Charles
25	=	Commerce-Convent Association	Assumption Iberville
26	=	Commerce-Mhoon Association	LaFourche West Baton Rouge
27	=	Commerce-Mhoon-Sharkey Association	Plaquemines

DATA CODINGS FOR SOIL ASSOCIATIONS (CONT'D)

LEGEND CODE #		SOIL ASSOCIATION NAME	PARISH
28	=	Commerce-Sharkey Association	Jefferson Orleans St. Bernard St. James
29	=	Convent Association	Ascension West Baton Rouge
30	=	Convent-Barbary Association	St. James
31	=	Convent-Commerce-Sharkey Association	St. James
32	=	Convent-Silty Alluvial Land Association	St. James
33	=	Crowley-Midland Association	Acadia
34	=	Crowley-Midland-Morey Association	Jefferson Davis
35	=	Crowley-Morey-Mowata Association	Cameron Jefferson Davis
36	=	Crowley-Mowata Association	Jefferson Davis
37	=	Crowley-Patoutville Association	Vermillion
38	=	Cypremort-Gallion Association	St. Martin
39	=	Deerford-Verdun Association	East Baton Rouge
40	=	Deerford-Verdun Frost Association	Ascension
41	=	Dexter-Calhoun Association	Livingston
42	=	Freeland-Loring-Oliver Association	East Baton Rouge
43	=	Fresh Water Marsh	Vermillion
44	=	Fresh Water Marsh-Harris Association	Cameron
45	=	Gallion Association	Lafayette
46	=	Gallion-Baldwin-Cypremort Association	Iberia
47	=	Calvez-Commerce Association	Ascension
48	=	Harris, chenier phase-Palm Beach Assn.	Vermillion
49	=	Harris, chenier variant-Palm Beach Assn.	Cameron
50	=	Harris-Fresh Water Marsh Association	Calcasieu
51	=	Harris-Fresh Water Marsh, Peat Association	Jefferson Davis
52	=	Harris-Morey-Mowata	Vermillion
53	=	Harris-Salt Water Marsh Association	Calcasieu Cameron
54	=	Iberia-Baldwin Association	Iberia
55	=	Iberia-Sharkey Association	Lafayette
56	=	Jeanerette Association	East Baton Rouge
57	=	Jeanerette-Oliver Association	St. Martin
58	=	Jeanerette-Patoutville Association	Iberia Lafayette Vermillion
59	=	Leaf-Bienville Association	Calcasieu
60	=	Loamy Alluvial Land	Jefferson Iberville Orleans St. Bernard St. Charles West Baton Rouge

LEGEND CODE #		SOIL ASSOCIATION NAME	PARISH
61	=	Loring-Oliver Association	St. Martin
62	=	Loring-Oliver-Frost Association	Iberia Vermillion
63	=	Marsh	LaFourche St. Charles
64	=	Marsh Association	St. Tammany Terrebonne
65	=	Marsh, drained	Jefferson Plaquemines St. Charles
66	=	Marsh-Fresh Water	Jefferson
67	=	Marsh-Freshwater, drained	LaFourche
68	=	Marsh-Mineral and organic marshland	Orleans
69	=	Marsh-Protected organic and mineral marshland	Orleans
70	=	Marsh-Salt Water	Jefferson Plaquemines St. Bernard
71	=	Maurepas Association	St. James
72	=	Memphis-Loring Association	Lafayette
73	=	Memphis-Rough Broken Land Association	Iberia
74	=	Mhoon-Commerce Association	East Baton Rouge Terrebonne
75	=	Midland-Beaumont Association	Jefferson Davis
76	=	Midland-Crowley Association	Acadia
77	=	Midland-Mowata-Crowley Association	Vermillion
78	=	Morey-Beaumont Association	Calcasieu Cameron Jefferson Davis
79	=	Mowata-Crowley Association	Calcasieu
80	=	Mowata-Morey-Crowley Association	Calcasieu
81	=	Myatt-Strough Association	Livingston St. Tammany Tangipahoa
82	=	Oliver-Calhoun Association	Ascension
83	=	Oliver-Calhoun-Loring Association	East Baton Rouge
84	=	Oliver-Grenada Association	Livingston
85	=	Oliver-Loring Association	East Baton Rouge Lafayette
86	=	Oliver-Loring-Terrace Escarfments Association	East Baton Rouge
87	=	Oliver-Providence Association	East Baton Rouge
88	=	Organic Soils and Clays of the Marshes	St. Mary
89	=	Organic Soils of the Swamps	St. Mary
90	=	Patoutville	St. Mary

LEGEND CODE #		SOIL ASSOCIATION NAME	PARISH
91	=	Patoutville-Jeanerette Association	Acadia
92	=	Providence Association	Tangipahoa
93	=	Providence-Ruston Association	Tangipahoa
94	=	Richland and Lintonia Soils	St. Mary
95	=	Ruston -Bowie Association	St. Tammany
96	=	Sand Beaches	Jefferson St. Bernard
97	=	Salt Water Marsh-Harris, Saline phase Association	Vermillion
98	=	Sharkey Association	Ascension St. Charles St. James West Baton Rouge
99	=	Sharkey-Baldwin-Iberia Association	St. Martin
100	=	Sharkey-Fausse Association	Ascension
101	=	Sharkey-Mhoon-Crevasse Association	East Baton Rouge
102	=	Sharkey-Swamp Association	Iberia Iberville St. Martin Terrebonne West Baton Rouge
103	=	Sharkey-Tunika Association	Assumption East Baton Rouge Iberville LaFourche
104	=	Swamp	Calcasieu Iberia Jefferson Orleans Plaquemines St. Bernard St. Charles
105	=	Swamp and Marsh	Tangipahoa
106	=	Swamp Association	St. Tammany Terrebonne
107	=	Swamp, drained	LaFourche Plaquemines
108	=	Swamp-Local Alluvial Land Association	Jefferson Davis Vermillion
109	=	Swamp-Made Land Association	Orleans
110	=	Swamp-Made Land, Drained	Jefferson
111	=	Swamp-Sharkey Association	Assumption
112	=	Swamp-Undrained	LaFourche
113	=	Waverly-Vicksburg Association	Tangipahoa

LEGEND

CODE #		SOIL ASSOCIATION NAME	PARISH
114	=	Waverly-Vicksburg-Ochlockonee Association	Livingston
115	=	Wet Alluvial Land Association	Acadia
116	=	Wrightsville-Acadia Association	Calcasieu
			Jefferson Davis

5. Data Variable: Soil Subsidence Potential

This data variable will reflect the total maximum possible loss of surface elevation after a soil with an organic or semifluid mineral layer is artificially drained and dried. Subsidence potential increases as the thickness of organic layers increases.

Data Source: Soils data and interpretations used in the compilation of this map were provided by the U.S. Department of Agriculture, Soil Conservation Service, Alexandria, Louisiana in cooperation with the State Planning Office, Baton Rouge, Louisiana.

Data Limits: This data will be restricted to areas within the coastal zone boundary.

Legend:
0 = None (including water bodies and soils with no significant subsidence potential)
1 = Low (0 to 3 inches)
2 = Moderate (3 to 16)
3 = High (16 to 51 inches)
4 = Very High (greater than 51 inches)

Policy: The subsidence category with the highest code value in a cell will have its value attributed to that cell.

Justification: This data variable will be used for studies in which structural development is considered. Continued subsidence of organic soils can be a severe limitation for many urban development types.

5. Data Variable: Soil Subsidence Potential

This data variable will reflect the total maximum possible loss of surface elevation after a soil with an organic or semifluid mineral layer is artificially drained and dried. Subsidence potential increases as the thickness of organic layers increases.

Data Source: Soils data and interpretations used in the compilation of this map were provided by the U.S. Department of Agriculture, Soil Conservation Service, Alexandria, Louisiana in cooperation with the State Planning Office, Baton Rouge, Louisiana.

Data Limits: This data will be restricted to areas within the coastal zone boundary.

Legend:
0 = None (including water bodies and soils with no significant subsidence potential)
1 = Low (0 to 3 inches)
2 = Moderate (3 to 16)
3 = High (16 to 51 inches)
4 = Very High (greater than 51 inches)

Policy: The subsidence category with the highest code value in a cell will have its value attributed to that cell.

Justification: This data variable will be used for studies in which structural development is considered. Continued subsidence of organic soils can be a severe limitation for many urban development types.

6. Data Variable: Land Loss Potential Due To Water Erosion

Land Loss Potential refers to the stability of soils adjacent to excavations, typically those for channels dug to service pipelines, transportation arteries or drainage. Data codes are based on soil properties such as texture, organic content and degree of wetness.

Data Source: Soils data and interpretations used in the compilation of this map were provided by the U.S. Department of Agriculture, Soil Conservation Service, Alexandria, Louisiana in cooperation with the State Planning Office, Baton Rouge, Louisiana.

Data Limits: This data will be restricted to areas within the coastal zone boundary.

Data Level: Two

Legend:

0 = None (water bodies)

1 = Low - soils that have properties that make make them slightly susceptible to gradual, continuous land loss if disturbed for channel construction or excavation.

2 = Medium - Soils that have properties that make them moderately susceptible to gradual, continuous land loss if disturbed for channel construction or excavation. These include soils that contain moderate amounts of organic matter, semifluid clays, sands and loamy sands.

3 = High - Soils that have properties that make them highly susceptible to gradual continuous land loss if disturbed for channel construction or excavation. These include the organic soils.

Policy: The land loss category with the highest code value in a cell will have its value attributed to that cell.

Justification: This data is necessary for studies in which soil slump or erosion, due to excavation or channelization, should be considered as a constraint to development.

7. Data Variable: Important Geologic Features

This data variable will show geologic features that have either particular benefits to ecological processes or have been assigned significant socio-economic values, or both. Features such as deep migratory game passes will, for example, possess critical ecological characteristics whereas the occurance of an oil deposit might possess more assigned social value rather than ecological significance.

Data Source: Burk and Associates, Inc. - Environmental Division

Data Limits: This data will be restricted to areas within the coastal zone boundary.

Data Level: One

Legend:
0 = None in cell
1 = Natural Gas Deposits
2 = Oil Deposits
3 = Barrier Islands
4 = Deep Migratory Game Passages
5 = Cheniers and Beach Ridges
6 = Salt Domes

Policy: The geologic feature with the highest code number will be used for each cell whenever that feature appears within a cell.

Justification: This data variable is needed to evaluate physical development constraints, show areas critical to storm protection and natural habitats, and show mineral deposits which are important revenue generators.

8. Data Variable: Areas Of Rapid Shoreline Reconfiguration

This data variable will show those areas of shoreline throughout the Louisiana Coastal Zone that have a high rate of either erosion or accretion. For example, the littoral processes of Grand Isle are very active. The locations sited, will be those areas where reconfiguration processes are significant to the extent that any alteration would involve considerable time and expense.

Data Source: Burk and Associates, Inc. - Environmental Division

Data Limits: This data will be restricted to areas within the coastal zone boundary.

Data Level: Three

Legend:
0 = Static land, little or no change
1 = Significant shoreline accretion
2 = Significant shoreline erosion

Policy: Areas of significant shoreline reconfiguration will be recorded whenever that characteristic appears within a cell.

Justification: This data variable will be used as a constraint for certain development types that would either disrupt the shoreline reconfiguration processes, or would be disrupted by them.

9. Data Variable: Surface Water Features

This data variable will depict all surface water feature locations as they exist across the data bases.

Data Sources: U.S.G.S. standard topographic quadrangle maps in both 15 minute and 7 1/2 minute series, October 1974 series Infrared Aerial Photography

Data Limits: This data will be coded throughout the data bases.

Data Level: One

Legend:
0 = None in Cell
1 = Wet lands
2 = Intermittant Stream
3 = Constructed Pond or Lagoon
4 = Constructed Canals
5 = Perrenial Streams and Bayous
6 = Natural Ponds and Minor Lakes (less than 100 acres)
7 = Rivers
8 = Major Lakes (100 acres or greater)
9 = Commercially Navigated Water Bodies

Policy: The drainage characteristic with the highest code number will be used for each cell whenever that code characteristic appears within a cell

Justification: This data variable is needed to asses physical development constraints and costs as well as potential habitat disruptions.

10. Data Variable: Ground Water Resources

This data variable will show four regions that differientiate ground water quality and quantity characteristics.

Data Source: Burk and Associates, Inc. - Environmental Division

Data Limits: This data will be restricted to areas within the coastal zone boundary.

Data Level: Two

Legend:

0 = None (water bodies)

1 = Region 1 is confined to the northern two-thirds of southeastern Louisiana, and has large quantities of soft ground water. Wells in this area generally range from 400 to 2400 feet, and yield 1000 to 3200 gpm. Heavy withdrawals have caused water levels to decline to 140 feet below the land surface at Baton Rouge, 120 feet at New Orleans, and 90 feet below the surface at Norco. These latter water levels refer to the level to which water will rise in a well without the assistance of pumps. For instance, flowing artesian wells are common in the region, and the highest known water level from them is about 125 feet above the land surface.

2 = Region 2 extends over soutwest and southcentral Louisiana. Wells in the quaternary sand and gravel deposits ranging in depth from 200 feet to 700 feet yield large quantities of water. The pumping rate obtainable from these wells is as much as 4000 gpm, but normally ranges between 1,000 and 2,000 gpm. Water levels range from 20 to 70 feet below the surface, except in the Lake Charles area where levels have declined to about 110 feet below the land surface.

3 = Region 3 is confined to the southeastern portions of Louisiana. Quaternary deposits in these areas contain fresh water which grades down to salt water within the same rate to prevent pumping of salt water.

4 = Region 4 Generally confined to the coastal marsh areas, Region 4 contains little or no potable water except occassional lenses of fresh water floating on salt water.

Data Variable: Ground Water Resources (Cont'd)

Policy: The region with the highest code value in a cell will have its value attributed to that cell.

Justification: This data variable is needed for studies in which the availability of fresh ground water is important and should be considered in a model.

11. Data Variable: Potential Flood Hazard

This data variable will show the levels of flooding that may be anticipated during major storms. Also, the line of surge reference (SRL) will be shown.

Data Source: Type 5 Flood Insurance Study for the Louisiana Gulf Coast; prepared by the New Orleans District Corps of Engineers, New Orleans Louisiana; May, 1970.

Data Limits: This data will be coded throughout the data bases.

Data Level: One

Legend:
0 = No flooding hazard
1 = Area Below the Flood Stage of a Standard Project Hurricane and Above the Flood Stage of a 100 year storm
2 = Area Below the Flood Stage of a 100 Year Storm and Above the Line of Storm Surge Attack
3 = Area Either At or Below the Line of Storm Surge Attack

Policy: The potential flood hazard category with the highest code value in a cell will have its value attributed to that cell.

Justification: This data variable is needed to assess probable storm damages, and related socio-economic and ecological disruptions.

12. Data Variable: Potential Washways & Inlet Formations

This data variable will show the location of major potential washways and inlet formations. These locations are usually characterized by low areas or breaches in frontal beach and chenier ridges. These potential washways or inlets could channel tidal surge during storm attack, causing untold damage to any development lying inland from them.

Data Source: U.S.G.S. standard topographic quadrangle maps in both 15 minute and 7 1/2 minute series. October 1974 series Infrared Aerial Photography.

Data Limits: This data will only occur in areas within the coastal zone boundary.

Data Level: Three

Legend:q
0 = None
1 = Presence or a potential washway or inlet information.

Policy: These areas shall be recorded whenever that characteristic appears within a cell.

Justification: This data variable is needed to assess situations in which excessive surge washing potential would be critical and should therefore affect land use or development decisions.

13. Data Variable: Endangered Species Habitats

This data variable will show the location of designated endangered species habitats throughout the data bases.

Data Source; Burk and Associates, Inc. - Environmental Division

Data Limits: This data will be restricted to areas within the coastal zone boundary.

Data Level: Two

Legend:
0 = None in cell
1 = Red wolf range
2 = American aligator concentrations
3 = Brown Pelican nesting areas
4 = Southern bald eagle nesting areas

Policy: The endangered species habitat with the highest code number will be used for each cell whenever that code characteristic appears within a cell.

Justification: This data variable will be used for studies in which either the social significance or the ecological value of the endangered species habitats should be used as a constraint to development or development related activities.

14. Data Variable: Important Water-Based Habitats

This data variable will show the location of water oriented and aquatic zoological habitats that have been identified as being particularly valuable to the coastal zone eco-system. The value that a habitat type possesses might be biological or solid-economic, or both.

Data Source: Burk and Associates, Inc. - Environmental Division

Data Limits: This data will be restricted to areas within the coastal zone boundary.

Data Level: Two

Legend:
0 = None in cell
1 = Red Swamp Crayfish Habitat-Atchafalaya Basin
2 = Unique Fishery Habitat - Barataria Basin
3 = Primary Fish and Shellfish Nursury Grounds
4 = Public Oyster Seed Grounds
5 = Private Leased Oyster Beds
6 = Live Rangia Clam Beds
7 = Exposed Shell Reefs
8 = Peak Duck Concentrations
9 = Geese Concentrations
10 = Seabird Colonies
11 = Wading Bird Rookeries
12 = Sea Turtle Nesting Area
13 = Roseate Spoonbill Habitat
14 = Big Burn - Deep Peat Burn Near Creole
15 = American Oil Company Waterfowl Impoundment

Policy: The water-based habitat with the highest code number will be used for each cell whenever that code characteristic appears within a cell.

Justification: This data variable will be used for studies in which either the social significance or the ecological value of the water-based habitats should be used as a constraint to development or development related activities.

15. Data Variable: Important Land-Based Habitats

This data variable will show the location of terrestrial habitat areas that have been identified as being particularly valuable to the coastal zone ecosystem. The value that a habitat type possesses might be biological or socio-economic, or both.

Data Source: Burk and Associates, Inc. - Environmental Division

Data Limits: This data will be restricted to areas within the coastal zone boundary.

Data Level: Two

Legend:
0 = None in cell
1 = Black Bear - Atchafalaya Basin
2 = Whitetail Deer Concentration
3 = Osprey Nesting Area

Policy: The land based habitat with the highest code number will be used for each cell whenever that code characteristic appears within a cell.

Justification: This data variable will be used for studies in which either the social significance or the ecological value of the land based habitats should be used as a constraint to development or development related activities.

16. Data Variable: Important Botanical Features

This data variable will show the location of Botanical Features that have been identified as being particularly valuable to the coastal zone ecosystem. The value that a Botanical Feature type possesses might be biological or socio-economic, or both.

Data Source: Burk and Associates, Inc. - Environmental Division

Data Limits: This data will be restricted to areas within the coastal zone boundary.

Data Level: Two

Legend:
0 = None in cell
1 = Major bottomland hardwood concentrations
2 = Black mangrove areas
3 = Submergent grass beds
4 = Unique Botanical assemblages

Policy: The botanical feature with the highest code number will be used for each cell whenever that code characteristic appears within a cell.

Justification: This data variable can be applied to studies in which the applied result of the study could disrupt the productivity of the botanical features, or in which these features should be used as critical points of interest.

17. Data Variable: Vegetation Types

This data variable will show the major vegetation associations that occur within the Louisiana Coastal Zone. These associations are not all inclusive, but will sufficiently characterize the vegetation in any given area.

Data Source: Burk and Associates, Inc. - Environmental Division

Data Limits: This data variable will be restricted to areas within the coastal zone boundary.

Data Level: One

Legend:
0 = None (water bodies)
1 = Pleistocene Deposits (species including pine, oak and cultivated rice fields)
2 = Alluvial Ridges (species including live oak and other bottomland hardwoods with much cultivated farmland)
3 = Forested Wetlands (species including Bald Cypress and Tupelo Gum)
4 = Fresh Marsh (species including maiden cane, water hyacinth, pennywort, pickerelweed, alligatorweed, cattail, and bulltongue)
5 = Intermediate Marsh (species including wiregrass, deer pea, bulltongue, wild millet, bullwhip and sawgrass)
6 = Brackish Marsh (species including three-cornered grass, coco, saltgrass and black rush)
7 = Saline Marsh (species including oystergrass, glasswort, black rush, saltgrass, saltwort and black mangrove)
8 = Modified Wetlands - areas of marsh or swamp that have been leveed, ditched, filled or drained.

Policy: The vegetation characteristic with the highest code value in a cell will have its value attributed to that cell.

Justification: This data variable will be used in studies which assess the physical appropriateness of an area in regards to its ability to accept development or development related activities.

18. Data Variable: Existing Land Use

This data variable will show existing human use of the land, using the classification system outlined by the Inter-Agency Steering Committee on Land Use Information and Classification in U.S. Geological Survey Circular 671 (1972). This classification system was modified for this project by Burk and Associates, Inc. - Environmental Division.

Data Source: United States Geological Survey, in cooperation with the State of Louisiana, Office of State Planning; Burk and Associates, Inc - Environmental Division, Coastal Resource Program Maps.

Data Limits: This data will be limited to areas within the Coastal Zone boundary.

Data Level: Two

Legend:
0 = None (water bodies)
1 = Wetlands
2 = Agriculture and Forestry
3 = Recreation
4 = Residential, Strip and Clustered Settlement
5 = Commercial and Services
6 = Transportation, Communication and Utilities
7 = Extractive
8 = Industrial

Policy: The land use classification with the highest code value in a cell will have its value attributed to that cell.

Justification: This data variable is needed to show the patterns and nature of land uses within the data bases. The data types will be used to determine the compatibility of new development with existing development.

19. Data Variable: Non-Urban Public and Semi-Public Lands

This data variable will show those land areas and facilities that are under public or semi-public ownership, and which lie outside major urban areas. Recreational areas will not be shown in this data variable; they will be shown in data variable #22. Also, all historic and archeological sites and land marks will be shown separately, in data variable #26.

Data Source: U.S.G.S. standard topographic quadrangle maps in both 15 minute and 7 1/2 minute series, Parish Maps - Louisiana Dept. of Highways. October 1974 series infrared aerial photography.

Data Limits: This data will be coded throughout the data bases.

Data Level: One

Legend:
0 = None in cell
1 = Land grants
2 = Refuges and other government owned land ranges
3 = Landfills and dumps
4 = Borrow pits
5 = Public and semi-public buildings
6 = Churches
7 = Cemeteries
8 = Airports
9 = Other misc. immovable features and lands.

Policy: Data codes will be attributed to cells whenever the corresponding feature lies within those cells. If more than one data type appears in a cell, the higher ranking type will be coded.

Justification: This data variable is necessary for studies in which the location of any activity or development type must or should avoid location such features, even if proximity to them is desirable.

20. Data Variable: Structural Units Density

This data variable will show the number of structural units or features in each grid cell. These densities or structures will be shown in ten levels, with zero being the category depicting no units, up to nine which will be those areas which are projected as completely developed or urban on the U.S.G.S. topographic maps.

Data Source: U.S.G.S. standard topographic quadrangle maps in both 15 minutes and 7 1/2 minute series. Parish Maps-Louisiana Department of Highways, October 1974 series infrared aerial photography

Data Limits: This data will be coded throughout the data bases.

Data Level: One

Legend:
0 = None in cell
1 through 8 = Varying numbers of units per cell, increasing as the code numbers approach 9.
9 = Designated urban areas

Policy: The actual number of structural units in each cell will be recorded. Because data interpretations are difficult for 20 to 30 data categories in a data variable, these categories will be reduced into a manageable range where each data category will correspond to a small range or structural units per cell.

Justification: This data variable will be used for studies involving social and economic considerations in regards to the potential for location of a development type.

21. Data Variable: Recreational Areas

This data variable will show recreational areas throughout the coastal zone that have been identified as being socially important. The areas listed are federal, state, or local lands or facilities used for the purpose of hunting, fishing, camping, game management, wildlife, protection, habitat preservation, and other related outdoor activities such as picknicking, boating, swimming, skiing, hiking and nature study. It should be noted that wetland and water-related activity types are emphasized in the listing.

Data Source: Burk and Associates, Inc. - Environmental Division

Data Limits: This data will be restricted to areas within the coastal zone boundary.

Data Level: One

Legend:
0 = None in cell
1 = National Wilderness Preservation Areas
2 = State Designated Wilderness areas
3 = Wildlife Management Areas
4 = National Parks
5 = State Parks and Monuments
6 = Federal Wildlife Refuges
7 = State Wildlife Refuges
8 = Private Wildlife Refuges
9 = Public Hunting, Fishing and Camping Areas
10 = Scenic Rivers
11 = Salt Domes
12 = Local Parks and Recreational Areas
13 = Public and Private Beaches
14 = Boat Launches and Marinas

Policy: Values will be attributed to a cell whenever the corresponding feature lies within that cell. If more than one data type appears in a cell, the higher ranking type will be coded.

Justification: This data variable will be used for studies in which recreational values should either encourage or discourage various situations of land use designation.

22. Data Variable: Transportation Type

This data variable will show the location of all land based transportation features.

Data Source: U.S.G.S. standard topographic quadrangle maps in both 15 minute and 7 1/2 minute series, Parish Maps-Louisiana Dept. of Highways, October 1974 infrared aerial photography.

Data Limits: This data will be coded throughout the data bases.

Data Level: One

Legend:
0 = None in cell
1 = Trail
2 = Unimproved road
3 = Two lane minor road
4 = Railroad easement
5 = Two lane major road
6 = Scenic Road
7 = Four lane major road
8 = Interstate right-of-way
9 = Airport zone

Policy: Values will be attributed to cells whenever the corresponding feature lies within those cells. If more than one data type appears in a cell, the higher ranking type will be coded.

Justification: This data variable will be used to study access and will also serve as a constraint in assessing land use appropriateness.

23. Data Variable: Major Community Support Facilities

This data variable will show the major elements of a regional or community public service network.

Data Source: U.S.G.S. standard topographic quadrangle maps in both 15 minute and 7 1/2 minute series, Parish Maps - Louisiana Department of Highways.

Data Limits: This data will be coded throughout the data bases.

Data Level: One

Legend:
0 = None in cell
1 = Major Power transmission lines
2 = Power generating and substations
3 = Guaging or pumping stations
4 = General public service buildings
(Such as police, fire, library, etc.)
5 = Microwave & Radio towers
6 = Schools
7 = Hospitals and health units
8 = Public waste disposal facilities

Policy: Values will be attributed to cells whenever the corresponding feature lies within those cells. If more than one data type appears in a cell, the higher ranking type will be coded.

Justification: This data variable will be used to reference the location of major public service features which would serve to attract development and yet could not easily be relocated.

24. Data Variable: Major Resource Production Areas

This data variable will show various resource extraction areas that are important to the regional economy. Other resource production areas, such as forest or agriculture, have been sufficiently documented in other data variables.

Data Source: Burk and Associates, Inc. - Environmental Division; Louisiana Oil and Gas Map; U.S.G.S. standard topographic quadrangle maps in both 15 minute and 7 1/2 minute series.

Data Limits: This data variable will be coded throughout the data bases.

Data Level: Two

Legend:
0 = None in cell
1 = Gas extraction sites
2 = Oil extractions sites
3 = Gravel and shell extraction sites
4 = Salt extraction sites
5 = Sulphur extraction sites

Policy: Values will be attributed to cells whenever the corresponding feature lies within those cells. If more than one data type appears in a cell, the higher ranking type will be coded.

Justification: This data variable will be used as a constraint in suitability models that could potentially initiate interruption of resource production activities.

25. Data Variable: Historical and Archeological Sites and Landmarks

This data variable will show the locations of features having noted cultural significance. These features will be of both regional and statewide importance.

Data Source: U.S.G.S. standard topographic quadrangle maps in both 15 minute and 7 1/2 minute series, Parish Maps - Louisiand Dept. of Highways, Burk and Associates, Inc. - Environmental Division

Data Limits: This data will be restricted to areas within the coastal zone boundary.

Data Level: One

Legend:
0 = None in cell
1 = Archaeological sites
2 = Regional historic sites and tourist attractions
3 = Sites on the national register of historic places

Policy: Values will be attributed to cells whenever the corresponding feature lies within those cells. If more than one data type appears in a cell, the higher ranking type will be coded.

Justification: This data variable is necessary for studies which would use the cultural values placed on these particular features as both development constraints for their protection, and as a potential attraction.

Note: Because a pinpoint location, or the exact shape or size of archeological sites shown in the data variable should always be used with some measure of proximity when applied in a suitability model.

26. Data Variable: Undisturbed Natural Areas

This data variable will show those areas of the coastal zone which are virtually untouched by human activity. Criteria for selecting the undisturbed natural areas include: Pristine quality, habitat diversity, representativeness of wetland types, unique ecological value, susceptibility to either natural or man-made damage, encroaching development pressure, aesthetic quality, educational and scientific value, and recreational value.

Data Source: Burk and Associates, Inc. - Environmental Division

Data Limits: This data will be restricted to areas within the coastal zone boundary.

Data Level: Three

Legend: 0 = None in cell
1 = Presence of an undisturbed natural area

Policy: Undisturbed natural areas will be coded whenever they occur within a cell.

Justification: This data variable will be used as a safeguard in studies that might otherwise direct development towards areas which are appropriate for preservation.

27. Data Variable: Unique Manmade Features

This data variable will show manmade features which are not appropriate for inclusion in other data variables or are worthy of special notation.

Data Source: U.S.G.S. standard topographic quadrangle maps in both 15 minute and 7 1/2 minute series, Parish Maps-Louisiana Dept. of Highways, October 1974 series infrared aerial photography.

Data Limits: This data will be coded throughout the data bases.

Data Level: One

Legend:
0 = None in cell
1 = Major oil and gas pipelines
2 = Levee ridges
3 = Refineries
4 = Major port facilities
5 = Storage tanks
6 = Elevated Roadways
7 = Other unique manmade features

Policy: If one of the data types appear in a cell, the entire cell will be attributed to that type. If more than one data type occurs within a cell, the one with the highest value will be coded.

Justification: This data variable is necessary as a "catch-all" collection of data types. These data types can be used in suitability models as is appropriate.

28. Data Variable: Governmental Boundaries

This data variable will show major changes in governmental jurisdiction and the outline of the coastal zone boundary as it is now accepted.

Data Source; U.S.G.S. standard topographic quadrangle maps in both 15 minute and 7 1/2 minute series; State of Louisiana, Office of State Planning.

Data Limits: This data will be coded throughout the data bases.

Data Level: One

Legend:
0 = None in cell
1 = City or Township boundaries
2 = Parish boundaries
3 = State boundary
4 = Coastal Zone Boundary

Policy: Boundaries will be coded for any cell in which they appear. If more than one boundary classification occurs within a cell, the one with the highest value will be coded.

Justification: This data variable will be used to show the limits of certain data variable and will serve to more accurately locate information on any particular computer map. Governmental Boundaries will also be used as data check points for any data base overlap and will aid in map splicing.

LAND CAPABILITY MAPS

Land capability refers to the development intensity that a given parcel of land can support without significant loss of its important qualities or features. Determinations of land capability are based on a combination of information types, such as those identified in the Data Variables. Using the processes of suitability modeling described previously, these data variables can be evaluated, compared and combined to show land capability for a number of development types.

Burk and Associates has chosen four topic areas as a preliminary evaluation of land capability. These topic areas are 1). industrial, 2). residential/commercial, 3). agricultural, and 4). recreational. Referring to the flow chart on page 9, it can be seen that the four preliminary topic evaluations are collapsed into the two sub-composits, urban uses and non-urban uses. As a final step, these two sub-composits are combined to create the final composit that shows land capability for development in general.

Supplement to this report is a series of Coastal Zone Parish maps that show general land capability. These maps should not be interpreted as either allowing or restricting a particular type of development. Rather, they should serve as indicators of one or more significant characteristics that could potentially restrict development if it occured. Following is a description of the three categories as they appear on the maps.

INTENSE DEVELOPMENT - These land areas are those that are virtually constraint free. Land shown in this category is generally capable of supporting most development types. Principally, these areas are ridge lands and areas within certain levees; or on the Pleistocene Terrace.

LIMITED DEVELOPMENT - These land areas show some combination of natural systems and/or human systems constraints that should restrict many development types. Although development can occur in these areas, it should be done with careful consideration being given to the various limiting factors that might be present.

CONSERVATION - These land areas contain characteristics which make them unsuitable for most development. Principally, these areas are wetlands containing valuable wildlife and fisheries habitat.